ABSTRACT OF THE DISCLOSURE

A method for analyzing and optimizing programs that operate on a data structure where the state of the data structure must be valid at certain program points. The program is represented as a control-flow graph. The method decomposes the state of the data structure into components, and applies partial redundancy elimination to place instructions that set the state of the data structure, with a variation that permits speculative placement. Application extends to manipulating a stack that keeps track of what to do should an exception arise during execution. In this context, a control-flow representation of contingencies is converted into placement of instructions that manipulate the stack.